Amendment to Claims

This listing of Claims will replace all prior versions and listings of claims in this Application.

Listing of Claims

Claim 1. (CURRENTLY AMENDED) A method of low-temperature nitridation of a silicon substrate comprising:

placing a silicon wafer in a vacuum chamber on a heated chuck;

maintaining the silicon wafer at a temperature of between about room temperature and 400 °C;

introducing a nitrogen-containing gas into the vacuum chamber, wherein the nitrogen-containing gas is taken from the group of gases consisting of N_2, NH_3, NH_2 and NH, and combinations thereof;

dissociating the nitrogen-containing gas into nitrogen with a xenon excimer lamp operating at a wavelength of 172 nm, and flowing the nitrogen over the silicon wafer; and

~~forming an~~ growing a silicon nitride layer on at least a portion of the silicon wafer, wherein the silicon nitride layer is formed from silicon in the silicon wafer and nitrogen from the dissociated nitrogen-containing gas, and wherein the silicon nitride layer so formed has a thickness of less than 5 nm.

Claim 2. (ORIGINAL) The method of claim 1 which further includes maintaining the vacuum chamber at a pressure of between about five mTorr. and 200 mTorr.

Claim 3. (ORIGINAL) The method of claim 1 wherein said introducing the nitrogen-

containing gas in the vacuum chamber includes providing a gas flow rate of between about two sccm and 50 sccm.

Claim 4. (ORIGINAL) The method of claim 1 wherein said maintaining includes maintaining the wafer in the vacuum chamber in contact with nitrogen for between about thirty seconds and three hours.

Claim 5. (PREVIOUSLY PRESENTED) The method of claim 1 which includes forming a silicon nitride layer on a silicon wafer in a time period of between about thirty seconds to three hours.

Claim 6. CANCELLED

Claim 7. (ORIGINAL) The method of claim 1 wherein said forming includes providing a positively charged interface across the nitride layer.

Claim 8. (ORIGINAL) The method of claim 1 wherein said placing includes placing a silicon wafer having a layer of silicon oxide on the upper surface thereof in a vacuum chamber.

Claim 9. (CURRENTLY AMENDED) A method of low-temperature nitridation of a silicon substrate comprising:

placing a silicon wafer in a vacuum chamber on a heated chuck;

maintaining the silicon wafer at a temperature of between about room temperature and 400 °C, and at a pressure of less than 200 mTorr;

introducing a nitrogen-containing gas into the vacuum chamber, wherein the nitrogen-containing gas is taken from the group of gases consisting of N_2, NH_3, NH_2 and NH, and combinations thereof;

dissociating the nitrogen-containing gas into nitrogen with a excimer lamp generating light at a wavelength of about 172 nm and flowing the nitrogen over the silicon wafer; and

~~forming an~~ growing a silicon nitride layer on at least a portion of the silicon wafer, wherein the silicon nitride layer is formed from silicon in the silicon wafer and nitrogen from the dissociated nitrogen-containing gas, and wherein the silicon nitride layer so formed has a thickness of less than 5 nm.

Claim 10. (PREVIOUSLY PRESENTED) The method of claim 9 which includes forming a silicon nitride layer on a silicon wafer in a time period of between about thirty seconds to three hours.

Claim 11. (ORIGINAL) The method of claim 9 wherein said maintaining includes maintaining the wafer in the vacuum chamber in contact with nitrogen for between about thirty seconds to three hours.

Claim 12. CANCELLED

Claim 13. (ORIGINAL) The method of claim 9 wherein said introducing the nitrogen-containing gas in the vacuum chamber includes providing a gas flow rate of between about two sccm and 50 sccm.

Claim 14. (ORIGINAL) The method of claim 9 wherein said forming includes providing a positively charged interface across the nitride layer.

Claim 15. (ORIGINAL) The method of claim 9 wherein said placing includes placing a silicon wafer having a layer of silicon oxide on the upper surface thereof in a vacuum chamber.

Claim 16. (CURRENTLY AMENDED) A method of low-temperature nitridation of a silicon substrate comprising:

placing a silicon wafer in a vacuum chamber on a heated chuck;

maintaining the silicon wafer at a temperature of between about room temperature and 400 °C;

providing a positively charged interface across the nitride layer;

introducing a nitrogen-containing gas into the vacuum chamber;

dissociating the nitrogen-containing gas into nitrogen with a xenon excimer lamp operating at a wavelength of 172 nm, and flowing the nitrogen over the silicon wafer; and

~~forming an~~ growing a silicon nitride layer on at least a portion of the silicon wafer, wherein the silicon nitride layer is formed from silicon in the silicon wafer and nitrogen from the dissociated nitrogen-containing gas, and wherein the silicon nitride layer so formed has a thickness

of less than 5 nm.

Claim 17. (ORIGINAL) The method of claim 16 wherein the nitrogen-containing gas is taken from the group of gases consisting of N_2, NH_3, NH_2 and NH, and combinations thereof.

Claim 18. (ORIGINAL) The method of claim 16 which further includes maintaining the vacuum chamber at a pressure of between about five mTorr. and 200 mTorr.

Claim 19. (PREVIOUSLY PRESENTED) The method of claim 16 which includes forming a silicon nitride layer on a silicon wafer in a time period of between about thirty seconds minute to three hours.

Claim 20. (ORIGINAL) The method of claim 16 wherein said maintaining includes maintaining the wafer in the vacuum chamber in contact with nitrogen for between about thirty seconds to three hours.

Claim 21. (ORIGINAL) The method of claim 16 wherein said introducing the nitrogen-containing gas in the vacuum chamber includes providing a gas flow rate of between about two sccm and 50 sccm.

Claim 22. (ORIGINAL) The method of claim 16 wherein said placing includes placing a silicon wafer having a layer of silicon oxide on the upper surface thereof in a vacuum chamber.